

Applicants regard as the invention. In particular, the Office Action asserts that it is not clear how pulse flows can be rectangular. The Office Action further asserts that the term “rectangular pulse” is known only for electrical signals. Applicants respectfully traverse the rejection.

Applicants respectfully submit that the term “rectangular pulse” is a well established term of art used in many different disciplines. One having ordinary skill in the art would understand that a rectangular pulse is essentially a step function. A measure of any variable that increases instantly and then decreases instantly would represent a rectangular pulse. This is true of electrical signals, velocities of objects, flow rates, etc. when charted over time. Furthermore, the rectangular pulse as applied to gas flow rates of the instant application is clearly shown in Figures 2-9. As shown in Figures 2-9, the various gases are applied in a rectangular pulse fashion. How the rectangular pulse is achieved is expressly disclosed in the specification. Page 15, paragraph [0019], lines 15 to 23 states:

When supplying the rectangular-pulsed mass flow rate to the reactive-vessel side, it is possible to realize a rectangular-step-pulsed mass flow rate by opening the first pneumatic operation valve 34 and closing the second pneumatic operation valve 35 before introducing gas, supplying a predetermined set flow rate to the vent side to realize a stable mass flow rate, and ***then instantaneously changing opening and closing of the first pneumatic operation valve 34 and second pneumatic operation valve 35***

In other words, by supplying a venting path for the gas, a particular mass flow can be established before the gas flows into the vessel. Once the gas is ready to flow to the reactor the vent path is closed and while the vessel path is simultaneously and instantaneously opened. Thus, from the perspective of film forming in the vessel, the

gas flow rate goes from zero to a particular flow rate value instantaneously. One having ordinary skill in the art would understand from this disclosure that by operating the valves as disclosed, a gas flow rectangular pulse is created. Furthermore, as acknowledged by the Office Action, the Applicant may act as his or her own lexicographer. See MPEP § 2111.01. For the reasons provided above, Applicants respectfully submit that term “rectangular pulse” is consistent with ordinary meaning and is also expressly defined in the specification.

In view of the above, Applicants respectfully request withdrawal of the §112 rejection of Claims 8-19.

Rejection Under 35 U.S.C. §103

Claims 8-19 are rejected under 35 U.S.C. §103(a) as being unpatentable over Yamoto (U.S. Publication No. 2002/0104477, hereinafter “Yamoto”) in view of Wang (U.S. Publication No. 2004/0121085, hereinafter “Wang”), Nguyen (U.S. Patent No. 6,689,220, hereinafter “Nguyen”) as evidenced by Raaijmakers (U.S. Publication No. 2002/0052124, hereinafter “Raaijmakers”). Applicants respectfully traverse this rejection.

Claim 8 recites a method for forming a laminated thin film on a substrate composed of plural unit layers, comprising, among other features:

a step of providing a gas supply system comprising a thin-film-component gas line, a hydrogen gas line, a first mass-flow controller positioned in the thin-film-component gas line, a first valve, a second valve, a first line coupling the first mass-flow controller to a vent, and a second line coupling the first mass-flow controller to the

reactive vessel, wherein the first valve is positioned in the first line between the first mass-flow controller and the vent and the second valve is positioned in the second line between the first mass-flow controller and the reactive vessel;

a step of opening the first valve and closing the second valve to supply a predetermined flow rate of the thin-film-component gas to the vent;

a step of simultaneously closing the first valve and opening the second valve to introduce rectangular pulsed flows of the thin-film-component gas to the reactive vessel. Applicants respectfully submit that Yamoto, Wang, Nguyen, and Raaijmakers do not teach or suggest all of the features recited by Claim 8.

As discussed above, the rectangular pulse is achieved in the instant application by simultaneously closing the first valve to the vent path and opening the second valve to the vessel. As shown in Figures 2-9 of instant application, this step creates a rectangular pulse or step function. The step achieves the desired layering and is expressly recited by Claim 8. The Office Action cites Yamoto and Wang for teaching several features recited by Claim 8. The Office Action admits, however, that Yamoto and Wang fail to teach or suggest the step of opening a first valve and closing a second valve. The Office Action cites Nguyen for allegedly curing the admitted deficiency of Yamoto and Wang. In particular, the Office Action asserts that because Nguyen teaches venting a gas prior to flowing the gas to a chamber it also teaches opening the valve to vent, closing the valve to the vessel, and then switching the valves.

Applicants first note that Claim 8 recites a step of simultaneously opening and closing the valves, not simply opening and closing the valves as stated by the Office Action. The Manual of Patent Examining Procedure (MPEP) states, “[a]ll words in a

claim must be considered in judging the patentability of that claim against the prior art." See MPEP § 2143.03. Thus, the Office Action improperly disregarded the word "simultaneously" when applying the prior art to the pending claims. As such, the Office Action neglects to discuss where Nguyen teaches simultaneously actuating the valves. Indeed, Applicants respectfully submit that Nguyen is silent with respect to this feature. Rather, as stated by the Office Action, Nguyen only teaches switching the valves to generally pulse the flow. See Column 7, lines 13-21. However, generally switching valves to produce a pulse is not the same simultaneously switching valves to create a rectangular pulse. Because Nguyen does not teach simultaneously actuating the valves, Nguyen does not teach a rectangular pulse, both of which are recited by Claim 8. Thus, Nguyen fails to cure the admitted deficiency of Yamato and Wang.

Raaijmakers is cited merely for providing evidence that the use of mass flow controllers to control the flow rate of gases is known in the art. Thus, Raaijmakers does not cure the admitted deficiency of the Yamato and Wang.

Claims 9-19 depend directly or indirectly from Claim 8. Applicants respectfully submit that Claims 9-19 are allowable for at least the same reasons Claim 8 is allowable, as well as for the additional subject matter recited therein.

For at least the above reasons, Applicants respectfully request reconsideration and withdrawal of the rejection of Claims 8-19 under 35 U.S.C. §103(a) over Yamato, Wang, Nguyen, and Raaijmakers.

CONCLUSION

Applicants respectfully submit that this application is in condition for allowance and such action is earnestly solicited. If the Examiner believes that anything further is desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned representative at the telephone number listed below to schedule a personal or telephone interview to discuss any remaining issues.

In the event that this paper is not being timely filed, Applicants respectfully petition for an appropriate extension of time. Any fees for such an extension, together with any additional fees that may be due with respect to this paper, may be charged to Counsel's Deposit Account Number 01-2300, referencing Docket Number 029567-00011.

Respectfully submitted,



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